

# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE United States Patient and Trademark, Office Address C. Det 1550 MER FOR PATENTS Address C. Det 1550 MER FOR PATENTS Alexandris, Virguis 22313-1450 suww.uspld.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO
09/519,719	03/07/2000	Hamid Noorbaklish	4150	8956
32588	7590 11/03/2003		EXAMINER	
	MATERIALS, INC. BLVD. M/S 2061		ALEJANDRO MI	ULERO, LUZ L
SANTA CLARA, CA 95050			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 11/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<u> </u>						
	Application No.	Applicant(s)				
	09/519,719	NOORBAKHSH ET AL.				
Office Action Summary	Examiner	Art Unit				
	Luz L. Alejandro	1763				
The MAILING DATE of this communication app Period for Reply	ears on the cover sheet with the c	orrespondence address				
A SHORTENED STATUTORY PERIOD FOR REPLY THE MAILING DATE OF THIS COMMUNICATION.  - Extensions of time may be available under the provisions of 37 CFR 1.13 after 51% (6) MONTHS from the mailing date of this communication.  - If the period for reply specified above is less than thirty (30) days, a reply - If NO period for reply is specified above, the maximum statutory period w - Failure to reply within the set or extended period for reply will, by statute, - Any reply received by the Office later than three months after the mailing earned patent term adjustment. See 37 CFR 1.704(b).	86(a). In no event, however, may a reply be tim within the statutory minimum of thirty (30) day- ill apply and will expire SIX (6) MONTHS from cause the application to become ABANDONE	hely filed s will be considered timely. the mailing date of this communication. D (35 U.S.C. 8 133).				
1) Responsive to communication(s) filed on 22 A	uaust 2003 .					
·- · · · · · · · · · · · · · · · · · ·	s action is non-final.					
3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11, 453 O.G. 213.						
Disposition of Claims						
4) Claim(s) 11-24,26-28,37,38,40,42 and 47-58 is/are pending in the application.						
4a) Of the above claim(s) is/are withdrawn from consideration.						
5) Claim(s) is/are allowed.						
6) Claim(s) 11-24,26-28,37,38,40,42 and 47-58 is/are rejected.						
7) Claim(s) is/are objected to.						
<ul><li>8) Claim(s) are subject to restriction and/or Application Papers</li></ul>	election requirement.					
9) The specification is objected to by the Examiner						
10) The drawing(s) filed on is/are: a) accepted or b) objected to by the Examiner.						
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).						
11) The proposed drawing correction filed on is: a) approved b) disapproved by the Examiner.						
If approved, corrected drawings are required in reply to this Office action.						
12)☐ The oath or declaration is objected to by the Examiner.						
Priority under 35 U.S.C. §§ 119 and 120						
13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).						
a)☐ All b)☐ Some * c)☐ None of:						
1. Certified copies of the priority documents	have been received.					
2. Certified copies of the priority documents	have been received in Application	on No				
<ul> <li>3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).</li> <li>* See the attached detailed Office action for a list of the certified copies not received.</li> </ul>						
14) Acknowledgment is made of a claim for domestic	priority under 35 U.S.C. § 119(e	e) (to a provisional application).				
<ul> <li>a)                The translation of the foreign language profits)             Acknowledgment is made of a claim for domestic</li> </ul>						
Attachment(s)						
Notice of References Cited (PTO-892)     Notice of Draftsperson's Patent Drawing Review (PTO-948)     Information Disclosure Statement(s) (PTO-1449) Paper No(s)	5) 🔲 Notice of Informal F	(PTO-413) Paper No(s) Patent Application (PTO-152)				
S. Patent and Trademark Office						

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#### **DETAILED ACTION**

### Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 53 and 58 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification, as originally filed, fails to disclose a semiconductor processing chamber as claimed, wherein a passage is disposed between the liner and the chamber wall, the passage being fluidly isolated from the chamber volume and having an inlet and an outlet adapted to circulate a heat transfer medium therethrough.

## Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 11-17, 20, 38, 40, 47-48, 51, 53 and 55 are rejected under 35 USC 103(a) as being unpatentable over Pu et al., WO 99/48130 in view of Masuda et al., U.S. Patent 6,171,438.

Pu et al. shows the invention substantially as claimed including a processing chamber comprising: a wall 12, a bottom wall 14, and a lid assembly 10 defining a chamber volume; a substrate support disposed within the chamber volume; and a removable chamber liner 26,27 disposed in the chamber volume and proximate the lid assembly, having a base substantially covering the bottom of the chamber body, and also circumscribing the substrate support; and wherein the outer wall further comprises a pumping port (see fig. 1 and page 4-line 14 to page 5-line 25). Note that the chamber liner 26,27 of the apparatus of Pu et al. comprises an outer wall 26 configured to line the sidewalls of the chamber, an inner wall 27 configured to line a substrate support disposed in the process volume of the chamber, and a bottom coupled between the outer wall and the inner wall.

Pu et al. fails to expressly disclose a passage formed in the chamber liner, the passage fluidly isolated from the chamber volume and having an inlet and an outlet

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adapted to circulate a fluid through the passage. Masuda et al. discloses an apparatus comprising a removable liner disposed within a chamber volume and having a passage formed therein to circulate a fluid through the passage in order to control the temperature of the inner wall of the reactor (see fig. 1 and col. 7-lines 23-43). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the chamber liner of the apparatus of Pu et al. so as to further comprise a passage formed therein to circulate a fluid as taught by Masuda et al. because this: a) will allow for temperature control of the inner walls of the chamber, b) will reduce contamination by forming a polymerized film on the liner walls (see abstract), c) the inner wall surfaces of the reactor will not be etched and consumed by plasma, and d) the running cost of the reactor is decreased (see col. 5, lines 24-31).

With respect to claim 13, official notice was taken in the office action mailed 10/11/01 and was not seasonably challenged and therefore, as noted in the office action mailed 10/23/02, these limitations are taken to be admitted prior art (see MPEP 2144.03). Furthermore, in order to mount a proper challenge to the examiner's taking of official notice, a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice (see In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971)).

With respect to claim 53, note that Masuda et al. shows a passage 104 disposed between the liner and the chamber wall, the passage being fluidly isolated from the chamber volume and having an inlet and an outlet adapted to circulate a heat transfer

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medium therethrough. Additionally, with respect to claim 55, note that the chamber liner further comprises an inner wall extending from the base inward of the outerwall.

Claim 18 is rejected under 35 USC 103(a) as being unpatentable over Pu et al., WO 99/48130 in view of Masuda et al., U.S. Patent 6,171,438, as applied to claims 11-17, 20, 38, 40, 47-48, 51, 53, 55 above, and further in view of Reimold et al., DE 31 10489 A1.

Pu et al. and Masuda et al. are applied as above but do not expressly disclose the use of bosses. Reimold discloses the use of bosses for providing connection for the supply or the removal of a heat exchanging medium (see equivalent abstract).

Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use bosses in the apparatus of Pu et al. modified by Masuda et al. in order to provide connection for the supply and removal of the heat exchanging medium.

Claims 19, 54, and 56-58 are rejected under 35 USC 103(a) as being unpatentable over Pu et al., WO 99/48130 in view of Masuda et al., U.S. Patent 6,171,438 as applied to claims 11-17, 20, 38, 40, 47-48, 51, 53 and 55 above, and further in view of Collins et al., EP 0892422 A2.

Pu et al. and Masuda et al. are applied as above but do not expressly disclose that the inner wall of the chamber liner further comprises a magnet disposed therein.

Collins et al. discloses an apparatus in which the inner wall of a chamber liner 2020

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comprises a magnet 82 disposed therein in order to confine the plasma (see, for example, Fig. 27 and its description). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Pu et al. modified by Masuda et al. as to further comprise a magnet disposed in the inner wall of the chamber liner in order to protect the pumping annulus by confining the plasma and therefore, enhance the apparatus.

Claims 21-24, and 49-50 are rejected under 35 USC 103(a) as being unpatentable over Pu et al., WO 99/48130 in view of Masuda et al., U.S. Patent 6,171,438 as applied to claims 11-17, 20, 38, 40, 47-48, 51, 53, and 55 above, and further in view of Shan et al., EP 0 814 495 A2.

Pu et al. and Masuda et al. are applied as above but do not expressly disclose the claimed structural limitations. Shan et al. discloses an apparatus having a center member being circumscribed by a flange and from which a cylindrical wall 10 projects, wherein the lid is disposed so as to define a plenum with the wall from which a fluid is coupled to the processing volume through plurality of nozzles (see fig. 1 and page 3-line 20 to page 4-line 45, and page 9, lines 7-46). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Pu et al. modified by Masuda et al. as to comprise the center member/lid/gas supply structure taught by Shan et al. in order to optimize the apparatus since such arrangement will provide for a more uniform distribution of the gas(es) into the chamber and towards the substrate.

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Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pu et al., WO 99/48130 in view of Masuda et al., U.S. Patent 6,171,438 as applied to claims 11-17, 20, 38, 40, 47-48, 51, 53, and 55 above, and further in view of Collins et al. WO 97/08734

Shan et al. and Masuda et al. do not expressly disclose that the passage is formed at least partially in the bottom. Collins et al. discloses an apparatus having a liner 2150 disposed adjacent the bottom of the chamber and thermally coupled to a cold sink 2155 (see fig. 48A and page 65-line 34 to page 66-line 18). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Masuda et al. as to further comprise the cold sink as taught by Collins et al. in order to optimize the apparatus by maintaining a temperature well-below the polymer condensation temperature, therefore avoiding the risk of contamination.

Claims 11-17, 20-24, 38, 40, 47-51, 53, 55 are rejected under 35 USC 103(a) as being unpatentable over Shan et al., EP 0 814 495 A2 in view of Masuda et al., U.S. Patent 6,171,438.

Shan et al. shows the invention substantially as claimed including a processing chamber comprising: a wall 20, a bottom wall 20, and a lid assembly 37 defining a chamber volume; a substrate support 30 disposed within the chamber volume; and a removable chamber liner disposed in the chamber volume and proximate the lid assembly, having a base substantially covering the bottom of the chamber body, and

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also circumscribing the substrate support 30; and wherein the outer wall further comprises a pumping port (see fig. 1 and page 3, line 24 to page 4, line 45). Note that the chamber liner of the apparatus of Shan et al. comprises an outer wall configured to line the sidewalls of the chamber, an inner wall configured to line a substrate support disposed in the process volume of the chamber, and a bottom coupled between the outer wall and the inner wall.

Shan et al. does not expressly disclose a passage formed in the chamber liner, the passage fluidly isolated from the chamber volume and having an inlet and an outlet adapted to circulate a fluid through the passage. Masuda et al. discloses an apparatus comprising a removable liner disposed within a chamber volume and having a passage formed therein to circulate a fluid through the passage in order to control the temperature of the inner wall of the reactor (see fig. 1 and col. 7-lines 23-43). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the chamber liner of the apparatus of Shan et al. so as to further comprise a passage formed therein to circulate a fluid as taught by Masuda et al. because such structure is known to be a suitable alternative for controlling the temperature of the side wall, to reduce contamination by forming a polymerized film on the liner walls, the inner wall surfaces of the reactor will not be etched and consumed by plasma, and the running cost of the reactor is decreased (see col. 5, lines 24-31).

With respect to claim 13, official notice was taken in the office action mailed 10-11-01 and was not seasonably challenged and therefore, as noted in the office action mailed 10-23-02, these limitations are taken to be admitted prior art (see MPEP

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2144.03). Furthermore, in order to mount a proper challenge to the examiner's taking of official notice, a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice (see In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971)).

With respect to claims 21-24, note that Shan et al. discloses an apparatus having a center member being circumscribed by a flange and from which a cylindrical wall 10 projects, wherein the lid is disposed so as to define a plenum with the wall from which a fluid is coupled to the processing volume through plurality of nozzles (see fig. 1 and page 3-line 20 to page 4-line 45, and page 9, lines 7-46).

With respect to claim 53, note that Masuda et al. shows a passage 104 disposed between the liner and the chamber wall, the passage being fluidly isolated from the chamber volume and having an inlet and an outlet adapted to circulate a heat transfer medium therethrough. Additionally, with respect to claim 55, note that the chamber liner further comprises an inner wall extending from the base inward of the outerwall.

Claim 18 is rejected under 35 USC 103(a) as being unpatentable over Shan et al., EP 0 814 495 A2 in view of Masuda et al., U.S. Patent 6,171,438, as applied to claims 11-17, 20-24, 38, 40, 47-51, 53, 55 above, and further in view of Reimold et al., DE 31 10489 A1.

Shan et al. and Masuda et al. are applied as above but do not expressly disclose the use of bosses. Reimold discloses the use of bosses for providing connection for the

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supply or the removal of a heat exchanging medium (see equivalent abstract).

Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use bosses in the apparatus of Shan et al. modified by Masuda et al. in order to provide connection for the supply and removal of the heat exchanging medium.

Claims 19, 54, and 56-58 are rejected under 35 USC 103(a) as being unpatentable over Shan et al., EP 0 814 495 A2 in view of Masuda et al., U.S. Patent 6,171,438, as applied to claims 11-17, 20-24, 38, 40, 47-51, 53, 55 above, and further in view of Collins et al., EP 0892422 A2.

Shan et al. and Masuda et al. are applied as above but do not expressly disclose that the inner wall of the chamber liner further comprises a magnet disposed therein. Collins et al. discloses an apparatus in which the inner wall of a chamber liner 2020 comprises a magnet 82 disposed therein in order to confine the plasma (see, for example, Fig. 27 and its description). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Masuda et al. as to further comprise a magnet disposed in the inner wall of the chamber liner in order to protect the pumping annulus by confining the plasma and therefore, enhance the apparatus.

Claims 26 and 28 are rejected under 35 USC 103(a) as being unpatentable over Shan et al., EP 0 814 495 A2 in view of Zhao et al., EP 0 855 735 A2.

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Shan et al. is applied as above and further discloses a lid 24, a liner 10/12 having a first portion having a base substantially covering a bottom of a chamber body and an outer wall disposed proximate a wall of the chamber body and a second portion disposed proximate a lid of the chamber body and having a second portion wall extending downward along the wall of the chamber body to the outer wall of the first portion of the liner, wherein a plurality of apertures are formed in the second portion of the liner, a plenum at least partially defined between the lid and the second portion of the liner (see fig. 1). Shan et al. does not expressly disclose that a nozzle is disposed in at least one of the apertures. Zhao et al. discloses an apparatus having a showerhead 40 that includes nozzles 42 (see col. 14, lines 43-51. Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. so as to use a showerhead comprising nozzles since such means are known in the art to effectively and efficiently introduce processing gases into the processing chamber.

Claim 27 is rejected under 35 USC 103(a) as being unpatentable over Shan et al., EP 0 814 495 A2 in view of Zhao et al., EP 0 855 735 A2 as applied to claims 26 and 28 above, and further in view of Takeuchi et al., U.S. Patent 5,824,158.

Shan et al., and Zhao et al. are applied as above but fail to expressly disclose that the nozzles are comprised of any of the claimed materials. Takeuchi et al. discloses a processing apparatus in which a nozzle made of quartz is used as to prevent the inclusion of impurities in the process gas (see col. 11-lines 53-56). In view

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of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Zhao et al. so as to include nozzles made of quartz because this will prevent the incursion of impurities into the process gas.

Claim 37 is rejected under 35 USC 103(a) as being unpatentable over Shan et al., EP 0 814 495 A2 in view of Zhao et al., EP 0 855 735 A2 as applied to claims 26 and 28 above, and further in view of Banholzer et al., U.S. Patent 5,565,058.

Shan et al., and Zhao et al. are applied as above but do not expressly disclose that the liner comprises a textured surface. Banholzer et al. discloses a vacuum chamber comprising a liner that is treated to roughen its surface to create a textured surface for increasing adhesion of materials deposited thereon during substrate processing. Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Zhao et al. as to texture the interior surface of the liner in order to increase adhesion of materials deposited thereon during substrate processing.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 A2 in view of Masuda et al., U.S. Patent 6,171,438 as applied to claims 11-17, 20-24, 38, 40, 47-51, 53, 55 above, and further in view of Collins et al. WO 97/08734

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Shan et al. and Masuda et al. do not expressly disclose that the passage is formed at least partially in the bottom. Collins et al. discloses an apparatus having a liner 2150 disposed adjacent the bottom of the chamber and thermally couple to a cold sink 2155 (see fig. 48A and page 65-line 34 to page 66-line 18). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Masuda et al. as to further comprise the cold sink as taught by Collins et al. in order to optimize the apparatus by maintaining a temperature well-below the polymer condensation temperature, therefore avoiding the risk of contamination.

Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 A2 in view of Masuda et al., U.S. Patent 6,171,438. as applied to claims 11-17, 20-24, 38, 40, 47-51, 55 above, and further in view of Zhao et al., EP 0 855 735 A2.

Shan et al. and Masuda et al. are applied as above and Shan et al. further discloses a wall 10 having an upper end closed by a top member 24/44, the wall adapted to line a portion of the chamber volume, a plurality of apertures in the top member, and a passage formed in the top member (see fig. 1 and its description). Shan et al. and Masuda et al. do not expressly disclose that a nozzle is disposed in at least one of the apertures. Zhao et al. discloses an apparatus having a showerhead 40 that includes nozzles 42 (see col. 14, lines 43-51). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the

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invention was made to modify the apparatus of Shan et al. modified by Masuda et al. so as to use a showerhead comprising nozzles since such means are known in the art to effectively and efficiently introduce processing gases into the processing chamber.

## Response to Arguments

Applicant's arguments filed 8/22/03 have been fully considered but they are not persuasive. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Additionally, the examiner wants to respectfully point out that the combination of references, as stated in the above rejections, discloses the claimed invention.

Applicant's arguments with respect to the rejections: a) under 35 U.S.C 102(e) over Matsuda et al., b) 35 U.S.C. 102(b) over Shinji, c) 35 U.S.C. 103(a) rejection of claims 13 and 39-43 over Matsuda et al., d) 35 U.S.C. 103(a) rejection of claims 21-24 and 49-50 over Matsuda et al. in view of Shan et al., and e) 35 U.S.C. 103(a) rejection of claim 39-41 and 43 over Shinji, are persuasive and the rejections have been withdrawn.

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#### Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 703-305-4545. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Luz L. Alejandro Primary Examiner Art Unit 1763

October 27, 2003